CENTERS FOR DISEASE CONTROL

September 9, 1988 / Vol. 37 / No. 35

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

Epidemiologic Notes and Reports

Mumps in the Workplace — Chicago

Between August 18 and December 25, 1987, 116 employees at three futures exchanges in Chicago developed clinically diagnosed mumps* (Figure 1). Three cases subsequently occurred in household contacts of affected exchange employees. Twenty-one persons developed complications; nine were hospitalized.

In September 1987, the employee health nurse at one of Chicago's four futures exchanges notified the Chicago Department of Health (CDOH) of a cluster of mumps cases among employees. Of the 119 cases subsequently identified among employees of three exchanges and their household contacts, three patients were tested for and had mumps-specific IgM antibody. Seventy-six cases occurred in persons working at exchange A; 39 cases, in persons at exchange B; and one case, in a person at exchange C.

Eighty-two (69%) of the affected exchange employees completed questionnaires. Two men at exchange A reported the onset of facial swelling on August 18. One was a 23-year-old phone clerk; the other was a 30-year-old trader working in a different area of the exchange. The first case at exchange B occurred in a 27-year-old man who had no known contact with an exchange A employee with mumps; he had onset of facial swelling on September 6. The only case at exchange C occurred in a 29-year-old woman whose facial swelling developed on October 13; she had no known contact with anyone with mumps from exchanges A or B.

Cases at exchanges A, B, and C could not be epidemiologically linked. Based on a median incubation period of 16–18 days, up to eight generations of cases occurred at exchanges A and B (Figure 1).

Because some employees work at multiple exchanges, the actual numbers of persons at risk, their ages, and their genders were not known for each of the exchanges. Based on estimates by exchange officials of the population at risk (approximately 7300 persons at each of exchanges A and B), the crude attack rate for exchange A (10 cases/1000 workers) was twice that of exchange B (5 cases/1000 workers). No denominator estimates were available for exchange C.

*A case of mumps was defined as the acute onset of facial or jaw swelling (parotitis) lasting ≥2 days or as acute epididymo-orchitis without parotitis.

Mumps — Continued

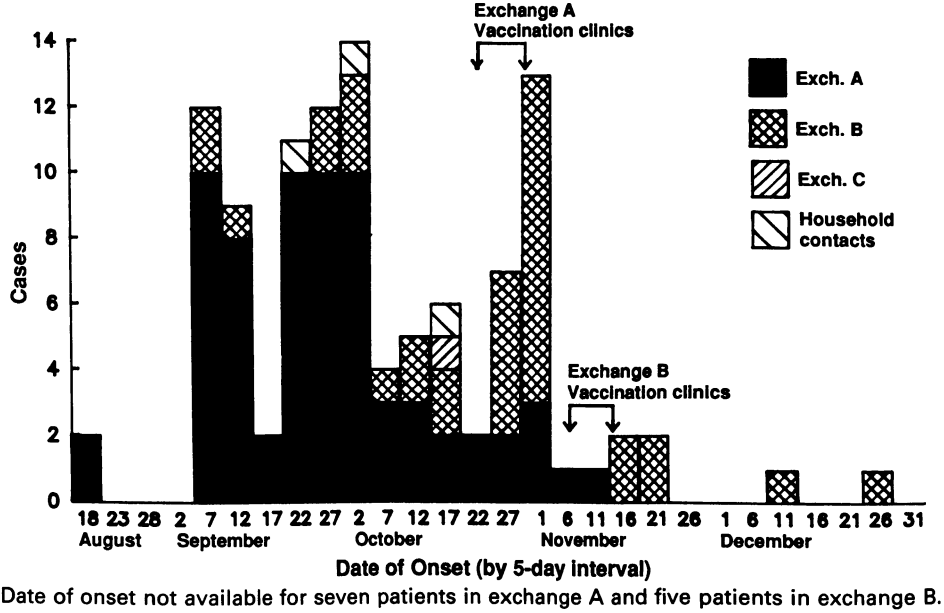
Age was known for 104 of the 119 patients and ranged from 17 to 70 years (median: 25 years). Persons <30 years of age accounted for 77% of the cases. By comparison, during January–July 1987, a period of widespread mumps activity in Chicago and its six metropolitan counties, 106 cases were reported in persons ≥20 years old. In the futures exchanges, almost twice as many men (79) as women (40) developed mumps. Of 92 patients for whom race/ethnicity was known, 84 (91%) were white, non-Hispanic, seven (8%) were black, and one was Hispanic. Although demographic data were not available for the population at risk, it was predominantly young, male, and white. Of the 99 patients for whom occupation was known, 94 (95%) worked on the trading floor.

Although more than one third of the 82 patients for whom information was available believed they had previously been vaccinated against mumps, only three could provide an immunization record as documentation. Almost three fourths of the patients had attended elementary or secondary school in Illinois, which did not have a mumps immunization law for school attendees until 1987.

In cooperation with exchanges A and B, the CDOH sponsored four voluntary vaccination clinics during the outbreak (Figure 1). Four hundred fifty-one doses of monovalent mumps vaccine were administered free of charge to nearly 6% of the workers at the two exchanges. The number of vaccinated persons who were actually susceptible was not known.

Twenty-three complications occurred in 21 patients (Table 1). Fifteen (31%) of the 48 ill men reported epididymo-orchitis that lasted an average of 9 days (range: 2–21 days). One of two cases of pancreatitis and one case of aseptic meningitis occurred in men with epididymo-orchitis. One case each of oophoritis and arthritis was reported.

FIGURE 1. Reported mumps cases, by date of onset* — Chicago futures exchanges, August–December 1987



*Date of onset not available for seven patients in exchange A and five patients in exchange B.

Mumps — Continued

Three women with mumps were pregnant; one developed premature labor that was subsequently arrested.

Nine (11%) of the 82 patients for whom data are available required hospitalization for a total of 41 days (range: 1–9 days; mean: 5 days) (Table 1). Epididymo-orchitis was responsible for four of nine hospital admissions.

Direct costs associated with health-care visits, medications, and hospitalizations for mumps were $56,406. Seventy-eight employees for whom data were available missed a total of 538 days of work (median: 7 days). The average cost per case was $1473 (Table 2).

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TABLE 1. Clinical findings of 21 persons with complications of mumps — Chicago futures exchanges, August–December 1987

Complication	No. persons	No. hospitalized	Total days hospitalized
Epididymo-orchitis	15	4	17
Pregnancy-related	2	2	8
Premature labor, infant with pneumonia	(1)	(1)	
First trimester pregnancy with dehydration	(1)	(1)	
Pancreatitis	2*	1*	4
Meningitis	1†	1†	9
Arthritis	1		
Oophoritis	1		
Parotitis (hospitalized)	1	1	3
Total	**21**	**9**	**41**

*One patient also had epididymo-orchitis.
†Patient also had epididymo-orchitis.

TABLE 2. Costs associated with mumps outbreak — Chicago futures exchanges, August–December 1987

Cost category	Costs	Cost per case (N=82)	Total no.
Direct costs	**$ 56,406**	**$ 688**	
Health-care visits	$ 7,440		108
Days of hospitalization	$ 32,918		41
Medications	$ 749		22
Outbreak control			
Person-hours personnel	$ 11,817		284
Doses of mumps vaccine	$ 3,482		779
Indirect costs	**$ 64,332**	**$ 785**	
Workdays missed			538*
Total	**$120,738**	**$1,473**	

*Data available on 78 persons.

Mumps — Continued

Immunization Program, BJ Francis, MD, State Epidemiologist, Illinois Dept of Public Health. Div of Immunization, Center for Prevention Svcs, CDC.

Editorial Note: Since licensure of live-virus mumps vaccine in 1967, the United States has made great strides in the control of mumps. Reported cases of mumps declined to a record low of 2982 in 1985 (1.2 cases/100,000 population), a 98% decrease from the 152,000 reported in 1968, the year mumps became a nationally notifiable disease. In 1986, however, the number of reported cases more than doubled (7790 mumps cases; 2.8 cases/100,000), a trend that continued through 1987, when the total was almost 12,900 cases. Through the first 30 weeks of 1988, 3166 cases have been reported, a 67% decrease from the same period in 1987.

Recent outbreaks have occurred in high schools and on college campuses, reflecting a change in the epidemiology of mumps and a shift in risk from elementary school-aged children to adolescents and young adults (*1–4*). During 1986–1987, 183 cases of clinically diagnosed mumps were reported from outbreaks at 10 Illinois colleges and universities (*1,5*). The increase in mumps cases in adolescents and young adults is particularly important in view of the more severe illness, higher frequency of complications, and greater costs associated with mumps in these age groups than in younger persons (*4–8*).

The types and rates of complications found during this investigation were similar to those found in other studies. For example, epididymo-orchitis affects 10%–38% of postpubertal males with mumps (*6*). The incidence of laboratory-verified aseptic meningitis increases with age and affects an estimated 0.6% of mumps cases in persons ≥20 years of age (*9*). Clinically symptomatic meningitis, characterized by headache and neck stiffness, is considerably more common. Mumps illness during the first trimester of pregnancy has been associated with an increased rate of spontaneous abortion possibly because of its effect on hormonal function of the placenta (*10*).

Benefit-cost analyses have shown that $7–$14 are saved for every dollar spent on mumps prevention (*11,12*). In the futures exchanges outbreak, the nearly $1500 cost for each mumps case contrasted dramatically with the cost of mumps vaccine, $4.47/dose in the public sector and $8.80/dose in the private sector in Chicago.

The age-specific changes in mumps epidemiology observed since vaccine licensure are similar to those noted for measles and rubella and reflect a vaccination policy oriented toward preschool and elementary school children. Although mumps vaccine was licensed in December 1967, it was less widely distributed than measles and rubella vaccines because of its relative expense† and its lower public health priority. Mumps vaccine was not recommended for universal use in children ≥12 months of age until 1977. Consequently, during 1967–1977, when mumps vaccine was used less prevalently, children may have had less exposure to mumps virus and no opportunity to receive mumps vaccine. As a result, a cohort of unvaccinated young adults may have remained susceptible as they entered the work force.

Direct evidence from field evaluations of vaccine efficacy and indirect evidence from vaccine use suggest that the failure to vaccinate susceptible persons, rather than vaccine failure or waning immunity, led to this outbreak (*3,4*). Most cases at the futures exchanges were reported in unvaccinated young adults, most of whom had been born and educated in Illinois, a state that until recently lacked a mumps immunization school law.

†The mumps component makes up slightly more than one half of the cost of combined measles-mumps-rubella (MMR) vaccine.

Mumps — Continued

The effectiveness of school immunization laws in reducing the incidence of mumps has been consistently demonstrated (*2,4,13*). Illinois adopted comprehensive legislation in 1987 requiring mumps immunization for children enrolling in kindergarten through grade 12. Such legislation is unlikely to markedly affect the current cohort of susceptible older adolescents and young adults but will probably reduce the number of mumps cases among school attendees and among future cohorts of young adults.

Closed environments such as the trading floors of the Chicago futures exchanges facilitate contact with respiratory secretions and person-to-person transmission of mumps. A peak in the number of mumps cases corresponded to the surge in futures trading activity that preceded the October 19, 1987, market decline (Figure 1). Anecdotal information from interviews with patients suggests that the intense activity at the futures exchanges may have encouraged some employees with mumps to work despite their illness, thus possibly exposing susceptible co-workers to mumps. Furthermore, the peak infectiousness of mumps occurs during the 48 hours before the onset of overt clinical illness (*14*). Outbreaks of mumps in the prevaccine era characteristically occurred in closed populations such as prisons, orphanages, and among classes of military recruits (*15*). Whether outbreaks similar to the Chicago one will occur in other workplace settings will depend on the mumps susceptibility of the work force and the nature of the workplace setting.

The outbreak among the Chicago futures exchanges was costly and could have been averted. It should alert both employers and the health-care community to the existence of mumps in adults and should remind persons of the need to have documented immunity to mumps. Furthermore, employers should report promptly to public health authorities cases of suspected mumps among employees. Current recommendations for measles vaccination of adults assume that most persons born before 1957 were likely to have been naturally infected and thus generally do not require routine measles immunization (*16*). Based on the pattern of gradual introduction of mumps vaccine into use since 1967 and the preponderance of adult mumps cases in persons <30 years of age, it may be both useful and practical to follow a similar guideline as that used for measles as a means of preventing other mumps outbreaks in adult populations.

References

1. CDC. Mumps outbreaks on university campuses—Illinois, Wisconsin, South Dakota. MMWR 1987;36:496–8,503–5.
2. CDC. Mumps—United States 1985–1986. MMWR 1987;36:151–5.
3. Wharton M, Cochi SL, Hutcheson RH, Bistowish JM, Schaffner W. A large outbreak of mumps in the post-vaccine era. J Infect Dis (in press).
4. Cochi SL, Preblud SR, Orenstein WA. Perspectives on the relative resurgence of mumps in the United States. Am J Dis Child 1988;142:499–507.
5. Sosin DM, Cochi SL, Jennings CE, Preblud SR. Mumps outbreaks on university campuses: a new lesson for higher education. Presented at the 115th annual meeting of the American Public Health Association, New Orleans, Louisiana, October 18–22, 1987.
6. Beard CM, Benson RC Jr, Kelalis PP, Elveback LR, Kurland LT. The incidence and outcome of mumps orchitis in Rochester, Minnesota, 1935 to 1974. Mayo Clin Proc 1977;52:3–7.
7. Philip RN, Reinhard KR, Lackman DB. Observations on a mumps epidemic in a "virgin" population. Am J Hyg 1959;69:91–111.
8. Sullivan KM, Halpin TJ, Kim-Farley R, Marks JS. Mumps disease and its health impact: an outbreak-based report. Pediatrics 1985;76:533–6.
9. Hayden GF, Preblud SR, Orenstein WA, Conrad JL. Current status of mumps and mumps vaccine in the United States. Pediatrics 1978;62:965–9.

Mumps — Continued

10. Siegel M, Fuerst HT, Peress NS. Comparative fetal mortality in maternal virus diseases: a prospective study on rubella, measles, mumps, chicken pox and hepatitis. N Engl J Med 1966;274:768–71.
11. Koplan JP, Preblud SR. A benefit-cost analysis of mumps vaccine. Am J Dis Child 1982;136:362–4.
12. White CC, Koplan JP, Orenstein WA. Benefits, risks and costs of immunization for measles, mumps and rubella. Am J Public Health 1985;75:739–44.
13. Chaiken BP, Williams NM, Preblud SR, Parkin W, Altman R. The effect of a school entry law on mumps activity in a school district. JAMA 1987;257:2455–8.
14. Brunell PA, Brickman A, O'Hare D, Steinberg S. Ineffectiveness of isolation of patients as a method of preventing the spread of mumps. N Engl J Med 1968;279:1357–61.
15. Feldman HA. Mumps. In: Evans AS, ed. Viral infections of humans: epidemiology and control. 2nd ed. New York: Plenum Medical Book Co., 1982:419–40.
16. Immunization Practices Advisory Committee. Measles prevention. MMWR 1987;36: 409–18,423–5.

TABLE I. Summary — cases of specified notifiable diseases, United States

Disease	35th Week Ending			Cumulative, 35th Week Ending		
	Sep. 3, 1988	Sep. 5, 1987	Median 1983-1987	Sep. 3, 1988	Sep. 5, 1987	Median 1983-1987
Acquired Immunodeficiency Syndrome (AIDS)	559	U *	183	21,211	13,086	5,127
Aseptic meningitis	204	465	447	3,534	6,846	5,855
Encephalitis: Primary (arthropod-borne & unspec)	22	47	31	499	820	728
Post-infectious	-	-	1	83	79	79
Gonorrhea: Civilian	11,267	13,508	17,013	451,728	524,267	585,934
Military	147	290	311	8,118	11,382	14,249
Hepatitis: Type A	454	451	451	16,318	16,572	14,581
Type B	511	432	506	15,033	17,311	17,032
Non A, Non B	64	50	54	1,746	2,111	2,445
Unspecified	33	32	91	1,428	2,097	3,279
Legionellosis	12	29	11	616	652	473
Leprosy	-	4	5	114	133	169
Malaria	48	25	16	589	607	608
Measles: Total	8	20	29	2,146	3,241	2,388
Indigenous	6	13	26	1,925	2,848	1,991
Imported	2	7	7	221	393	265
Meningococcal infections	24	44	31	2,057	2,102	1,986
Mumps	26	111	38	3,401	10,225	2,407
Pertussis	54	105	74	1,611	1,582	1,582
Rubella (German measles)	1	5	8	151	283	529
Syphilis (Primary & Secondary): Civilian	563	540	585	27,218	23,402	18,709
Military	1	-	4	113	125	125
Toxic Shock syndrome	5	5	5	217	228	263
Tuberculosis	447	413	449	13,939	14,206	14,256
Tularemia	10	6	5	139	142	142
Typhoid Fever	6	13	11	221	222	222
Typhus fever, tick-borne (RMSF)	26	11	34	462	459	542
Rabies, animal	63	60	98	2,824	3,278	3,592

TABLE II. Notifiable diseases of low frequency, United States

	Cum. 1988		Cum. 1988
Anthrax	-	Leptospirosis (La. 1)	21
Botulism: Foodborne (Hawaii 1)	17	Plague	10
Infant (Hawaii 1)	25	Poliomyelitis, Paralytic	-
Other	3	Psittacosis (Calif. 1)	56
Brucellosis	41	Rabies, human	-
Cholera (La. 1)	1	Tetanus (Up. N.Y. 1)	33
Congenital rubella syndrome	3	Trichinosis	36
Congenital syphilis, ages < 1 year	171		
Diphtheria	-		

*Because AIDS cases are not received weekly from all reporting areas, comparison of weekly figures may be misleading.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending September 3, 1988 and September 5, 1987 (35th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988
UNITED STATES	21,211	3,534	499	83	451,728	524,267	16,318	15,033	1,746	1,428	616	114
NEW ENGLAND	867	197	19	4	14,158	15,791	596	836	97	66	26	14
Maine	26	10	1	-	279	479	17	38	3	1	5	-
N.H.	21	20	1	3	178	272	37	53	7	4	3	-
Vt.	9	12	6	-	89	140	9	27	5	2	1	-
Mass.	463	88	8	1	4,825	5,772	283	524	66	46	14	13
R.I.	58	42	-	-	1,198	1,411	68	65	9	-	3	1
Conn.	290	25	3	-	7,589	7,717	182	129	7	13	-	-
MID. ATLANTIC	7,205	332	39	4	68,083	83,858	1,038	2,029	107	164	164	8
Upstate N.Y.	933	211	26	1	9,272	11,762	506	517	46	15	66	-
N.Y. City	3,901	74	8	3	28,013	43,229	225	897	12	119	27	7
N.J.	1,767	47	5	-	9,882	10,845	197	492	38	28	40	1
Pa.	604	-	-	-	20,916	18,022	110	123	11	2	31	-
E.N. CENTRAL	1,555	520	121	12	74,807	79,105	1,088	1,608	159	80	126	4
Ohio	345	178	36	3	17,121	17,788	236	376	26	13	50	-
Ind.	80	54	16	-	5,790	6,390	104	221	15	20	13	-
Ill.	730	66	27	9	21,843	23,930	322	345	57	19	-	3
Mich.	322	197	31	-	24,609	23,978	259	478	40	25	46	-
Wis.	78	25	11	-	5,444	7,019	167	188	21	3	17	1
W.N. CENTRAL	494	160	37	7	19,041	21,132	946	710	78	24	59	1
Minn.	102	27	9	3	2,575	3,282	77	93	15	3	2	-
Iowa	28	24	8	-	1,438	2,018	37	67	13	1	15	-
Mo.	256	60	1	-	10,877	11,211	538	414	33	12	13	-
N. Dak.	4	-	4	-	102	200	4	7	2	4	1	-
S. Dak.	5	13	1	1	348	389	7	3	2	-	14	-
Nebr.	30	5	8	2	1,069	1,368	42	36	1	-	5	-
Kans.	69	31	6	1	2,632	2,664	241	90	12	4	9	1
S. ATLANTIC	3,582	772	73	27	129,559	136,834	1,488	3,214	265	228	103	1
Del.	51	20	3	-	2,012	2,216	25	92	6	2	9	-
Md.	359	92	7	3	13,452	15,456	203	459	27	21	15	1
D.C.	334	16	1	1	9,430	9,113	12	32	3	1	1	-
Va.	225	81	23	3	9,203	9,987	270	210	54	147	6	-
W. Va.	13	19	12	-	914	1,011	10	45	3	3	-	-
N.C.	201	96	16	-	18,285	19,984	224	562	68	-	28	-
S.C.	116	13	-	1	9,937	11,163	31	357	9	5	16	-
Ga.	504	86	1	-	24,971	24,311	322	449	10	5	14	-
Fla.	1,779	349	10	19	41,355	43,593	391	1,008	85	44	14	-
E.S. CENTRAL	520	231	44	6	35,996	39,608	495	929	129	7	24	1
Ky.	65	66	11	1	3,629	3,981	367	162	44	2	9	-
Tenn.	235	21	13	-	12,175	13,867	78	472	34	-	7	-
Ala.	131	119	20	2	11,088	12,761	33	230	43	5	5	1
Miss.	89	25	-	3	9,104	8,999	17	65	8	-	3	-
W.S. CENTRAL	1,816	471	56	3	50,529	58,620	1,920	1,282	149	362	15	19
Ark.	66	9	2	-	5,013	6,792	225	70	2	12	3	-
La.	252	75	17	1	10,295	10,474	96	241	20	11	5	1
Okla.	99	43	4	-	4,757	6,545	362	127	33	22	7	-
Tex.	1,399	344	33	2	30,464	34,809	1,237	844	94	317	-	18
MOUNTAIN	633	134	22	2	10,024	13,843	2,293	1,153	187	116	32	1
Mont.	10	2	-	-	314	384	26	38	10	3	1	-
Idaho	8	1	-	-	252	494	110	78	5	3	-	-
Wyo.	5	2	-	-	138	291	5	11	3	-	3	-
Colo.	230	49	3	-	2,181	3,031	152	144	52	55	8	1
N. Mex.	30	9	2	-	954	1,514	413	166	15	2	1	-
Ariz.	208	41	8	1	3,649	4,794	1,189	449	56	35	13	-
Utah	47	19	4	1	384	437	230	95	31	14	3	-
Nev.	95	11	5	-	2,152	2,898	168	172	15	4	3	-
PACIFIC	4,539	717	88	18	49,531	75,476	6,454	3,272	575	381	67	65
Wash.	274	-	6	4	4,390	5,902	1,445	545	139	40	14	4
Oreg.	135	-	-	-	2,167	2,769	950	403	59	21	-	1
Calif.	4,042	634	78	14	41,857	65,089	3,749	2,241	368	310	50	52
Alaska	15	13	2	-	690	1,138	302	44	5	5	-	1
Hawaii	73	70	2	-	427	578	8	39	4	5	3	7
Guam	1	-	-	-	97	151	9	11	-	2	1	4
P.R.	844	35	3	1	935	1,417	31	184	32	32	-	3
V.I.	32	-	-	-	297	181	1	5	2	-	-	-
Amer. Samoa	-	-	-	-	65	57	3	2	-	5	-	2
C.N.M.I.	-	-	-	-	34	-	1	2	-	4	-	1

N: Not notifiable U: Unavailable C.N.M.I.: Commonwealth of the Northern Mariana Islands

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending September 3, 1988 and September 5, 1987 (35th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported*		Total									
	Cum. 1988	1988	Cum. 1988	1988	Cum. 1988	Cum. 1987	Cum. 1988	1988	Cum. 1988	1988	Cum. 1988	Cum. 1987	1988	Cum. 1988	Cum. 1987
UNITED STATES	589	6	1,925	2	221	3,241	2,057	26	3,401	54	1,611	1,582	1	151	283
NEW ENGLAND	47	-	80	-	50	253	179	-	105	1	120	94	-	5	1
Maine	2	-	7	-	-	3	7	-	-	-	11	17	-	-	1
N.H.	1	-	66	-	44	152	20	-	95	-	33	22	-	3	-
Vt.	4	-	-	-	-	26	13	-	3	-	3	4	-	-	-
Mass.	25	-	1	-	2	49	82	-	7	-	47	36	-	1	-
R.I.	6	-	-	-	-	2	21	-	-	1	10	1	-	1	-
Conn.	9	-	6	-	4	21	36	-	-	-	16	14	-	-	-
MID. ATLANTIC	79	4	794	2	46	573	192	-	284	2	102	196	-	12	11
Upstate N.Y.	23	3	19	2§	18	40	94	-	78	1	62	119	-	2	9
N.Y. City	43	1	40	-	4	456	52	-	94	1	3	-	-	7	1
N.J.	5	-	217	-	11	39	45	-	35	-	4	10	-	1	1
Pa.	8	-	518	-	13	38	1	-	77	-	33	67	-	2	-
E.N. CENTRAL	32	-	132	-	46	303	283	1	690	4	161	203	-	24	35
Ohio	7	-	2	-	22	5	97	-	97	-	25	53	-	1	-
Ind.	2	-	57	-	-	-	24	1	68	1	61	13	-	-	-
Ill.	1	-	55	-	15	131	63	-	258	2	26	14	-	19	25
Mich.	19	-	18	-	5	29	61	-	174	1	29	41	-	4	9
Wis.	3	-	-	-	4	138	38	-	93	-	20	82	-	-	1
W.N. CENTRAL	16	-	11	-	1	230	77	-	118	-	98	95	-	-	1
Minn.	5	-	10	-	1	39	17	-	-	-	42	13	-	-	-
Iowa	2	-	-	-	-	-	-	-	31	-	19	31	-	-	1
Mo.	5	-	1	-	-	189	27	-	30	-	15	24	-	-	-
N. Dak.	-	-	-	-	-	1	-	-	-	-	11	10	-	-	-
S. Dak.	-	-	-	-	-	-	3	-	1	-	5	3	-	-	-
Nebr.	1	-	-	-	-	-	10	-	11	-	-	1	-	-	-
Kans.	3	-	-	-	-	1	20	-	45	-	6	13	-	-	-
S. ATLANTIC	75	1	290	-	15	130	364	2	561	7	182	236	-	16	14
Del.	1	-	-	-	-	32	2	-	-	-	6	5	-	-	2
Md.	9	-	11	-	3	5	42	-	100	6	32	11	-	1	2
D.C.	11	-	-	-	-	1	7	1	213	-	1	-	-	-	-
Va.	10	-	141	-	2	1	40	-	147	-	30	44	-	11	1
W. Va.	-	-	6	-	-	-	6	-	9	-	7	34	-	-	-
N.C.	11	-	1	-	3	5	60	-	40	1	47	98	-	-	1
S.C.	8	-	-	-	-	2	33	1	5	-	1	-	-	-	-
Ga.	4	-	-	-	-	1	52	-	25	-	30	23	-	1	1
Fla.	21	1	131	-	7	83	122	-	22	-	28	21	-	3	7
E.S. CENTRAL	10	-	55	-	-	5	196	1	385	8	60	32	-	2	3
Ky.	-	-	35	-	-	-	40	-	174	-	6	1	-	-	2
Tenn.	-	-	-	-	-	-	116	1	197	3	20	9	-	2	1
Ala.	6	-	1	-	-	3	27	-	11	5	32	17	-	-	-
Miss.	4	-	19	-	-	2	13	N	N	-	2	5	-	-	-
W.S. CENTRAL	56	-	11	-	3	409	135	10	662	-	93	158	-	7	11
Ark.	2	-	-	-	1	-	17	-	85	-	11	10	-	3	2
La.	9	-	-	-	-	-	39	10	262	-	16	39	-	-	-
Okla.	8	-	8	-	-	3	14	-	173	-	39	109	-	1	5
Tex.	37	-	3	-	2	406	65	-	142	-	27	-	-	3	4
MOUNTAIN	30	1	118	-	21	491	59	7	159	22	477	134	-	6	24
Mont.	4	1	6	-	19	128	2	-	2	-	1	6	-	-	8
Idaho	1	-	-	-	1	-	7	-	3	1	262	42	-	-	1
Wyo.	-	-	-	-	-	2	-	-	2	-	1	5	-	-	1
Colo.	11	-	112	-	1	9	14	-	28	-	14	48	-	2	-
N. Mex.	1	-	-	-	-	317	11	N	N	7	37	8	-	-	-
Ariz.	8	-	-	-	-	31	15	3	106	14	141	23	-	-	4
Utah	4	-	-	-	-	1	9	3	6	-	20	2	-	3	10
Nev.	1	-	-	-	-	3	1	1	12	-	1	-	-	1	-
PACIFIC	244	-	434	-	39	847	572	5	437	10	318	434	1	79	183
Wash.	14	-	2	-	-	41	48	-	40	1	72	64	-	-	1
Oreg.	11	-	3	-	-	76	31	N	N	5	25	56	-	-	2
Calif.	208	-	426	-	31	726	472	5	364	4	170	155	1	55	117
Alaska	2	-	-	-	-	-	6	-	9	-	6	6	-	-	2
Hawaii	9	-	3	-	8	4	15	-	13	-	45	153	-	24	61
Guam	-	-	-	-	1	2	-	-	2	-	-	-	-	1	1
P.R.	2	-	190	-	-	724	8	-	8	1	13	16	-	2	2
V.I.	-	-	-	-	-	-	-	1	29	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	-	2	-	3	-	-	-	-	-	-
C.N.M.I.	1	-	-	-	-	-	1	-	2	-	-	-	-	-	-

*For measles only, imported cases includes both out-of-state and international importations.
N: Not notifiable U: Unavailable †International §Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending September 3, 1988 and September 5, 1987 (35th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1987	Cum. 1988	Cum. 1988	Cum. 1988	Cum. 1988
UNITED STATES	27,218	23,402	217	13,939	14,206	139	221	462	2,824
NEW ENGLAND	731	403	17	335	434	4	17	10	11
Maine	12	1	4	18	21	-	-	-	1
N.H.	6	3	3	7	15	-	-	-	3
Vt.	3	2	2	2	9	-	1	-	-
Mass.	281	189	8	184	243	3	11	5	-
R.I.	24	8	-	32	35	-	-	2	-
Conn.	405	200	-	92	111	1	5	3	7
MID. ATLANTIC	6,955	4,421	33	2,706	2,414	-	41	16	351
Upstate N.Y.	356	165	18	356	356	-	6	8	17
N.Y. City	5,073	3,210	5	1,470	1,132	-	24	6	-
N.J.	608	463	3	426	462	-	11	-	10
Pa.	918	583	7	454	464	-	-	2	324
E.N. CENTRAL	721	631	33	1,544	1,616	1	24	41	104
Ohio	69	76	23	286	312	-	6	34	5
Ind.	36	44	-	150	145	-	2	2	17
Ill.	355	335	1	664	717	-	11	2	22
Mich.	238	129	9	371	369	1	4	2	30
Wis.	23	47	-	73	73	-	1	1	30
W.N. CENTRAL	157	114	26	364	421	65	3	67	339
Minn.	16	13	5	60	85	3	2	2	106
Iowa	16	19	5	38	30	-	-	-	13
Mo.	96	63	7	182	234	38	1	40	16
N. Dak.	1	-	2	9	6	1	-	-	68
S. Dak.	-	8	1	25	21	16	-	7	95
Nebr.	22	7	2	10	16	2	-	1	11
Kans.	6	4	4	40	29	5	-	17	30
S. ATLANTIC	9,447	7,979	16	3,011	3,045	4	24	144	923
Del.	74	52	1	22	31	1	-	1	39
Md.	509	404	3	292	278	-	1	20	226
D.C.	465	244	-	132	101	-	1	-	5
Va.	274	196	-	275	306	2	9	12	254
W. Va.	34	6	-	54	76	-	-	2	70
N.C.	535	453	7	302	325	-	1	79	5
S.C.	474	515	2	329	316	-	-	16	66
Ga.	1,568	1,127	-	504	528	1	2	10	180
Fla.	5,514	4,982	3	1,101	1,084	-	10	4	78
E.S. CENTRAL	1,334	1,274	18	1,167	1,229	8	3	62	195
Ky.	45	13	7	270	280	4	1	16	76
Tenn.	583	516	8	326	365	3	-	32	55
Ala.	394	332	3	357	357	-	1	8	62
Miss.	312	413	-	214	227	1	1	6	2
W.S. CENTRAL	2,804	2,841	20	1,759	1,675	42	7	107	381
Ark.	160	182	1	186	197	28	-	19	61
La.	552	498	-	200	188	-	3	1	7
Okla.	107	99	7	165	159	12	-	75	26
Tex.	1,985	2,062	12	1,208	1,131	2	4	12	287
MOUNTAIN	536	471	24	373	421	10	8	11	257
Mont.	3	8	-	12	10	-	1	6	154
Idaho	2	5	3	14	26	-	-	1	8
Wyo.	1	1	-	2	2	2	-	3	31
Colo.	76	78	3	43	120	5	3	1	23
N. Mex.	39	40	-	74	67	2	1	-	7
Ariz.	115	227	9	170	160	-	3	-	29
Utah	11	20	9	18	16	1	-	-	5
Nev.	289	92	-	40	20	-	-	-	-
PACIFIC	4,533	5,268	30	2,680	2,951	5	94	4	263
Wash.	116	97	3	137	173	-	6	1	-
Oreg.	193	198	1	102	79	-	6	1	-
Calif.	4,190	4,961	26	2,307	2,527	3	79	2	255
Alaska	10	3	-	29	42	2	-	-	8
Hawaii	24	9	-	105	130	-	3	-	-
Guam	3	2	-	16	26	-	-	-	-
P.R.	421	641	-	155	195	-	4	-	47
V.I.	1	4	-	4	2	-	-	-	-
Amer. Samoa	-	-	-	3	7	-	1	-	-
C.N.M.I.	1	-	-	17	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending September 3, 1988 (35th Week)

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
NEW ENGLAND	636	422	122	56	17	19	37
Boston, Mass.	191	118	40	20	5	8	14
Bridgeport, Conn.	55	37	10	4	2	2	3
Cambridge, Mass.	22	15	6	1	-	-	3
Fall River, Mass.	31	24	2	3	-	2	-
Hartford, Conn.	61	35	13	7	4	2	3
Lowell, Mass.	25	17	7	1	-	-	1
Lynn, Mass.	13	8	5	-	-	-	-
New Bedford, Mass.	26	23	1	2	-	-	-
New Haven, Conn.	47	28	6	10	1	2	5
Providence, R.I.	40	24	12	1	1	2	-
Somerville, Mass.	11	9	1	1	-	-	-
Springfield, Mass.	34	25	7	1	1	-	1
Waterbury, Conn.	20	14	3	1	2	-	4
Worcester, Mass.	60	45	9	4	1	1	3
MID. ATLANTIC	2,717	1,686	561	311	90	69	126
Albany, N.Y.	46	37	5	2	2	-	2
Allentown, Pa.	22	13	8	-	1	-	-
Buffalo, N.Y.	110	71	27	5	4	3	13
Camden, N.J.	35	21	5	5	3	1	2
Elizabeth, N.J.	23	14	6	2	-	1	-
Erie, Pa.†	31	23	7	-	-	1	-
Jersey City, N.J.	58	33	12	9	1	3	-
N.Y. City, N.Y.	1,488	911	285	208	46	38	63
Newark, N.J.	111	53	25	21	8	4	1
Paterson, N.J.	24	11	5	6	2	-	1
Philadelphia, Pa.	394	241	95	30	14	14	21
Pittsburgh, Pa.†	71	48	18	5	-	-	2
Reading, Pa.	35	27	6	2	-	-	1
Rochester, N.Y.	96	59	25	4	5	3	4
Schenectady, N.Y.	23	16	4	3	-	-	2
Scranton, Pa.†	17	12	2	2	-	1	-
Syracuse, N.Y.	58	41	10	3	4	-	8
Trenton, N.J.	33	23	8	2	-	-	1
Utica, N.Y.	20	16	3	1	-	-	2
Yonkers, N.Y.	22	16	5	1	-	-	3
E.N. CENTRAL	2,219	1,451	466	165	64	73	86
Akron, Ohio	52	41	9	2	-	-	3
Canton, Ohio	37	28	5	2	2	-	1
Chicago, Ill.§	564	362	125	45	10	22	16
Cincinnati, Ohio	145	93	34	7	4	7	17
Cleveland, Ohio	164	95	41	15	4	9	2
Columbus, Ohio	124	80	26	7	5	6	1
Dayton, Ohio	110	77	24	6	2	1	6
Detroit, Mich.	234	136	50	31	9	8	9
Evansville, Ind.	48	32	10	5	-	1	1
Fort Wayne, Ind.	52	37	6	5	3	1	2
Gary, Ind.	25	14	7	2	1	1	1
Grand Rapids, Mich.	50	33	7	5	2	3	4
Indianapolis, Ind.	155	94	37	13	8	3	2
Madison, Wis.	44	28	10	3	1	2	2
Milwaukee, Wis.	126	89	27	1	7	2	2
Peoria, Ill.	42	35	6	-	-	1	1
Rockford, Ill.	44	32	8	2	2	-	6
South Bend, Ind.	47	34	10	3	-	-	2
Toledo, Ohio	91	67	15	3	2	4	6
Youngstown, Ohio	65	44	9	8	2	2	2
W.N. CENTRAL	878	602	173	50	22	31	46
Des Moines, Iowa	53	39	12	1	1	-	5
Duluth, Minn.	21	16	3	1	-	1	2
Kansas City, Kans.	43	26	10	3	2	2	-
Kansas City, Mo.	110	72	25	8	1	4	5
Lincoln, Nebr.	32	28	2	1	1	-	2
Minneapolis, Minn.	246	167	42	17	5	15	12
Omaha, Nebr.	81	53	15	4	5	4	6
St. Louis, Mo.	138	85	38	8	5	2	7
St. Paul, Minn.	83	62	12	6	1	2	4
Wichita, Kans.§	71	54	14	1	1	1	3

Reporting Area	All Causes, By Age (Years)						P&I**
	All Ages	≥65	45-64	25-44	1-24	<1	Total
S. ATLANTIC	1,141	679	245	138	39	39	44
Atlanta, Ga.	154	86	40	21	3	4	6
Baltimore, Md.	202	109	50	31	4	7	6
Charlotte, N.C.	77	47	20	5	3	2	4
Jacksonville, Fla.	95	53	27	8	5	2	1
Miami, Fla.	102	53	14	25	7	3	1
Norfolk, Va.	49	29	10	2	3	5	4
Richmond, Va.	81	51	19	7	2	2	8
Savannah, Ga.	46	27	11	6	1	1	4
St. Petersburg, Fla.	81	62	11	3	1	4	2
Tampa, Fla.	65	45	11	3	3	3	3
Washington, D.C.	173	107	31	23	7	5	5
Wilmington, Del.	16	10	1	4	-	1	-
E.S. CENTRAL	796	512	165	59	26	32	36
Birmingham, Ala.	131	71	29	11	9	11	3
Chattanooga, Tenn.	58	32	13	6	4	3	1
Knoxville, Tenn.	83	62	15	4	1	1	7
Louisville, Ky.	140	103	23	6	1	5	2
Memphis, Tenn.	174	105	46	13	6	4	11
Mobile, Ala.	84	59	9	9	2	5	5
Montgomery, Ala.	10	6	-	4	-	-	-
Nashville, Tenn.	116	74	30	6	3	3	7
W.S. CENTRAL	1,652	991	375	181	59	45	65
Austin, Tex.	45	28	7	4	4	2	4
Baton Rouge, La.	24	19	1	3	1	-	1
Corpus Christi, Tex.§	47	36	10	1	-	-	1
Dallas, Tex.	208	108	58	29	6	7	9
El Paso, Tex.	62	37	10	11	2	2	3
Fort Worth, Tex	95	54	25	7	4	5	9
Houston, Tex.§	694	408	161	85	24	16	18
Little Rock, Ark.	91	53	20	7	6	4	4
New Orleans, La.	88	56	18	7	4	3	-
San Antonio, Tex.	160	102	32	18	4	4	8
Shreveport, La.§	49	32	10	4	2	1	3
Tulsa, Okla.	89	58	23	5	2	1	5
MOUNTAIN	597	398	97	61	20	21	26
Albuquerque, N. Mex.	72	50	9	6	6	1	3
Colo. Springs, Colo.	32	25	3	2	-	2	2
Denver, Colo.	96	63	16	11	1	5	6
Las Vegas, Nev.	96	57	25	9	3	2	5
Ogden, Utah	20	17	2	-	-	1	2
Phoenix, Ariz.	118	72	18	17	5	6	1
Pueblo, Colo.	19	16	2	1	-	-	2
Salt Lake City, Utah	45	26	10	4	3	2	2
Tucson, Ariz.	99	72	12	11	2	2	3
PACIFIC	1,659	1,048	298	176	66	68	100
Berkeley, Calif.	24	14	8	1	-	1	-
Fresno, Calif.	79	53	10	7	3	6	15
Glendale, Calif.	16	14	2	-	-	-	1
Honolulu, Hawaii	55	39	10	3	1	2	8
Long Beach, Calif.	87	54	15	9	2	7	11
Los Angeles Calif.	356	204	71	48	21	10	10
Oakland, Calif.	57	37	6	7	3	4	2
Pasadena, Calif.	42	23	9	6	2	2	2
Portland, Oreg.	120	78	24	7	6	5	5
Sacramento, Calif.	145	94	24	16	5	6	14
San Diego, Calif.	130	82	23	14	5	5	10
San Francisco, Calif.	150	88	32	23	3	4	5
San Jose, Calif.	155	103	27	12	7	6	9
Seattle, Wash.	136	87	22	15	5	7	-
Spokane, Wash.	61	45	8	3	2	3	1
Tacoma, Wash.	46	33	7	5	1	-	7
TOTAL	12,295††	7,789	2,502	1,197	403	397	566

*Mortality data in this table are voluntarily reported from 121 cities in the United states, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

**Pneumonia and influenza.

†Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

††Total includes unknown ages.

§Data not available. Figures are estimates based on average of past available 4 weeks.

Perspectives in Disease Prevention and Health Promotion

Premature Mortality Due to Homicides — United States, 1968–1985

In 1985, homicides accounted for 612,556 years of potential life lost before age 65 (YPLL) or 5.2% of total YPLL. Assault by firearms and explosives, the major cause of homicides, resulted in 376,291 YPLL or 61.4% of homicide-attributable YPLL. Seventy-six percent of the homicide-attributable YPLL occurred in males (Table 1). As in past years (*1*), the YPLL rate per 100,000 persons was highest for black males (1669.3) and lowest for white females (99.4).

Homicide-attributable YPLL were calculated for 1968 through 1985 using final mortality data for ICD E-codes* 960–969 from the National Center for Health Statistics, CDC. During these years, homicide-attributable YPLL increased 44% from 424,718 to 612,556. This increase contrasts with total YPLL, which declined 25% from 15,888,756 to 11,851,397 during the same 18-year period. As a proportion of total YPLL, homicide-attributable YPLL increased 93% from 1968 through 1985 from 2.7% to 5.2% (Figure 1). Homicides by firearms and explosives increased from 1.8% of total YPLL in 1968 to 3.1% in 1985.

Since 1968, the average age at death from all causes before age 65 has been steadily increasing; thus the average YPLL per death (i.e., 65 minus the average age at death) has been decreasing. In contrast, the average age at death attributed to homicides before age 65 decreased steadily through the 1970s but appears to be stabilizing in the 1980s (Figure 2). For the 18-year period, the 44% increase in homicide-attributable YPLL reflects the 36% increase in the number of homicide deaths multiplied by the 6% increase in the average YPLL per homicide ($1.44 = 1.36 \times 1.06$). The 25% decrease in total YPLL during this period reflects a 17% decrease in all deaths multiplied by a 10% decrease in the average YPLL per death.

Reported by: Biometrics Br and Epidemiology Br, Div of Injury Epidemiology and Control, Center for Environmental Health and Injury Control, CDC.

*International Classification of Diseases, External Causes of Injury and Poisoning.

TABLE 1. Homicide-attributable years of potential life lost before age 65 (YPLL) and rates per 100,000 population, by sex and race — United States, 1985

	YPLL			Deaths			Average age at death (yrs)	Average YPLL per death
Sex and race	No.	(%)	Rate	No.	(%)	Rate		
Males								
White	241,931	(39.5)	273.0	7,467	(40.7)	8.4	32.6	32.4
Black	212,713	(34.7)	1669.3	6,284	(34.2)	49.3	31.2	33.9
Other	10,361	(1.7)	316.6	305	(1.7)	9.3	31.0	34.0
All	464,972	(75.9)	444.4	14,056	(76.6)	13.4	31.9	33.1
Females								
White	87,895	(14.3)	99.4	2,630	(14.3)	3.0	31.6	33.4
Black	55,738	(9.1)	403.9	1,550	(8.4)	11.2	29.0	36.0
Other	4,020	(0.7)	119.4	115	(0.6)	3.4	30.0	35.0
All	147,619	(24.1)	139.8	4,295	(23.4)	4.1	30.6	34.4
Total	**612,556**	**(100.0)**	**291.4**	**18,351**	**(100.0)**	**8.7**	**31.6**	**33.4**

Premature Mortality — Continued

FIGURE 1. Percent of total years of potential life lost before age 65 (YPLL) attributed to homicides and firearms-related homicide — United States, 1968–1985

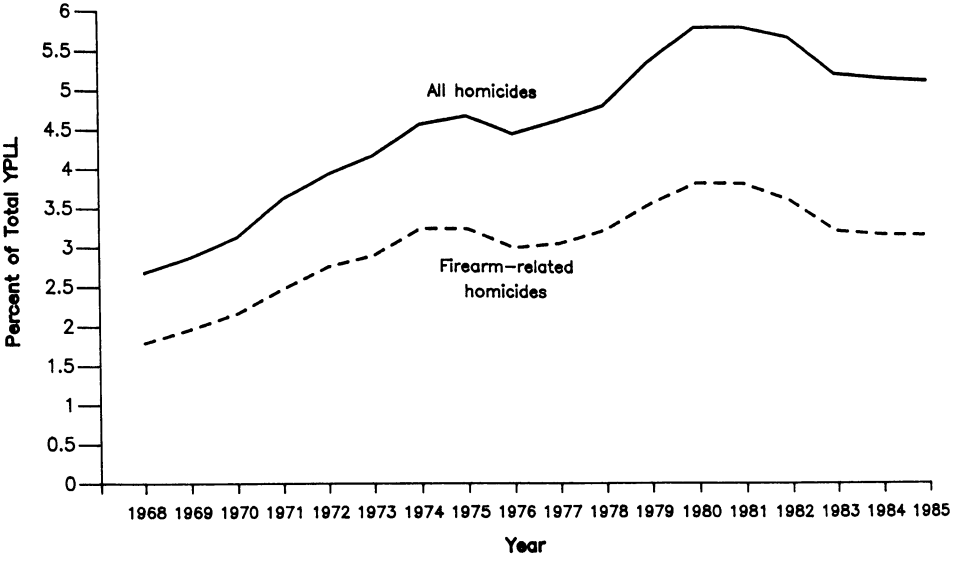
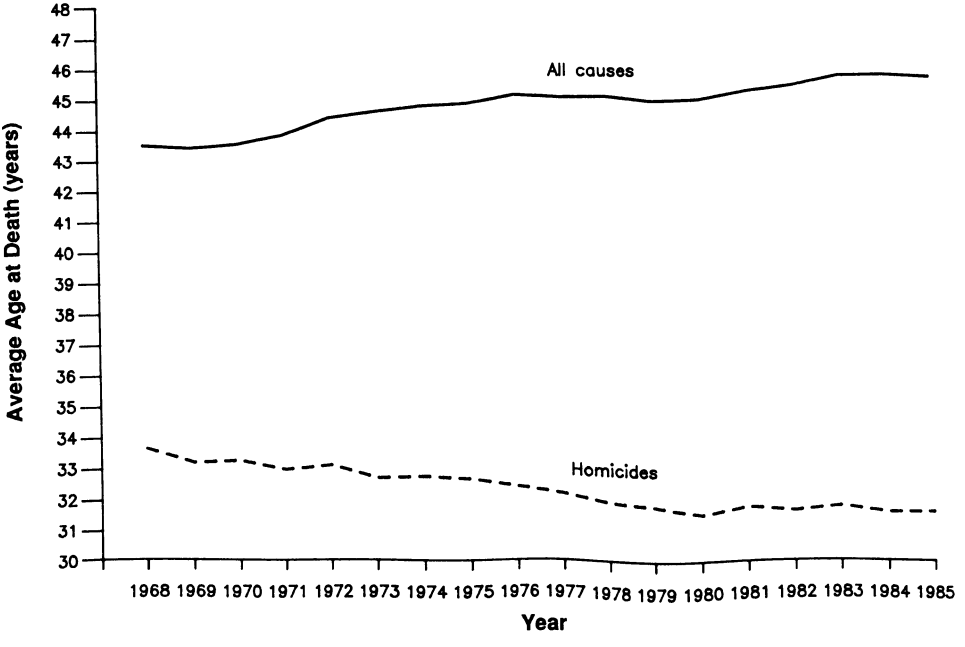


FIGURE 2. Average age at death for persons <65 years of age — United States, 1968–1985



Premature Mortality — Continued

Editorial Note: The dramatic increase in homicide-attributable YPLL since 1968 highlights the need for public health efforts directed toward the prevention of interpersonal violence. Recent data from the Federal Bureau of Investigation (FBI) show a 5.9% increase in homicides from 1985 through 1987 (*2*).

The increased impact of homicides in the United States has helped strengthen the Public Health Service's commitment to focus on violence as a public health problem. One effort, the Surgeon General's Workshop on Violence and Public Health, held in 1985 (*3*), led to regional conferences that have fostered interdisciplinary efforts directed toward this problem. Cooperation among sectors such as criminal justice, social services, health care, and mental and public health may enable development of effective programs for prevention of homicides and for identification, treatment, and referral of victims of nonfatal interpersonal violence.

Since 1978, the homicide rate for black males 15–24 years of age has decreased 13%, suggesting that the 1990 objective for this target group (60/100,000) can be attained (*4*). However, YPLL data suggest that future public health objectives also should target other population groups.

Comprehensive surveillance of homicides in the United States uses both vital statistics and FBI data. In contrast, surveillance of nonfatal injuries from intentional interpersonal violence is almost nonexistent, although the incidence of this related problem is estimated to be at least 100 times that of homicides (*4*). Uniform hospital discharge data systems and trauma registries that include cause-of-injury information can serve as the basis for surveillance of nonfatal injuries from violence. These systems can also aid communities in defining priorities for preventing violence and evaluating the effectiveness of interventions.

References

1. CDC. Premature mortality due to suicide and homicide—United States, 1983. MMWR 1986; 35:357–60,365.
2. Federal Bureau of Investigation. Uniform crime reports for the United States. Washington, DC: US Department of Justice, Federal Bureau of Investigation, 1987.
3. Department of Health and Human Services, Department of Justice. Surgeon General's Workshop on Violence and Public Health report. Rockville, Maryland: US Department of Health and Human Services, Public Health Service, 1986; DHHS publication no. HRS-D-MC 86-1.
4. CDC. Homicides among black males 15–24 years of age, 1970–1984. In: Public health surveillance of 1990 injury control objectives for the nation. CDC surveillance summaries, Feb. 1988. MMWR 1988;37(no. SS-1):53–60.

Notice to Readers

Publication of NIOSH Criteria Documents on Welding, Brazing, and Thermal Cutting and on Radon Progeny

The National Institute for Occupational Safety and Health (NIOSH) periodically issues criteria documents that examine health risks associated with various occupations. Two such documents were recently published* and are described below.

*Copies of the documents can be obtained without charge from the Information Dissemination Section, Division of Standards Development and Technology Transfer, National Institute for Occupational Safety and Health, 4676 Columbia Parkway, Cincinnati, Ohio 45226; telephone: (513) 533-8287.

NIOSH Criteria – Continued

Criteria for a Recommended Standard: Welding, Brazing, and Thermal Cutting. This document examines the occupational health risks associated with welding, brazing, and thermal cutting and provides criteria for eliminating or minimizing the risks encountered by workers in these occupations. An estimated 700,000 workers in the United States are involved in the welding of various materials. The major health concerns associated with these occupations are increased risks of lung cancer and acute or chronic respiratory diseases.

The etiologic basis for this excess risk is difficult to determine because of uncertainties about smoking habits, possible interactions among the various components of welding emissions, and possible exposures to other occupational carcinogens. For workers who weld on stainless steel, the increased risk for lung cancer appears to be associated with exposure to fumes that contain nickel and chromium.

The prevalence and severity of nonmalignant respiratory conditions are not well characterized among welders, but these conditions have been observed in both smoking and nonsmoking workers in welding-associated occupations. Excess morbidity and mortality exist among welders even when reported exposures are below current Occupational Safety and Health Administration (OSHA) permissible exposure limits (PELs) for the many individual components of welding emissions.

An occupational exposure limit for total welding emissions cannot be established because the composition of welding fumes and gases varies for different welding processes and because the various components of a welding emission may interact to produce adverse health effects. Therefore, exposures to all welding emissions should be reduced to the lowest feasible concentrations using state-of-the-art engineering controls and work practices. Any applicable exposure limits for individual chemical and physical agents associated with welding (i.e., NIOSH recommended exposure limits [RELs], OSHA PELs, or limits recommended by consensus groups) should be considered upper boundaries of exposure.

The criteria document contains NIOSH recommendations for medical monitoring of exposed workers and for engineering controls, good work practices, and worker education. Guidelines are also provided for respiratory protection and protective clothing.

A Recommended Standard for Occupational Exposure to Radon Progeny in Underground Mines. This document examines the occupational health risks associated with exposures to radon progeny (radon and its short-lived, alpha-radiation-emitting, radioactive decay products) in underground mines, and it establishes criteria for minimizing the risks encountered by miners.

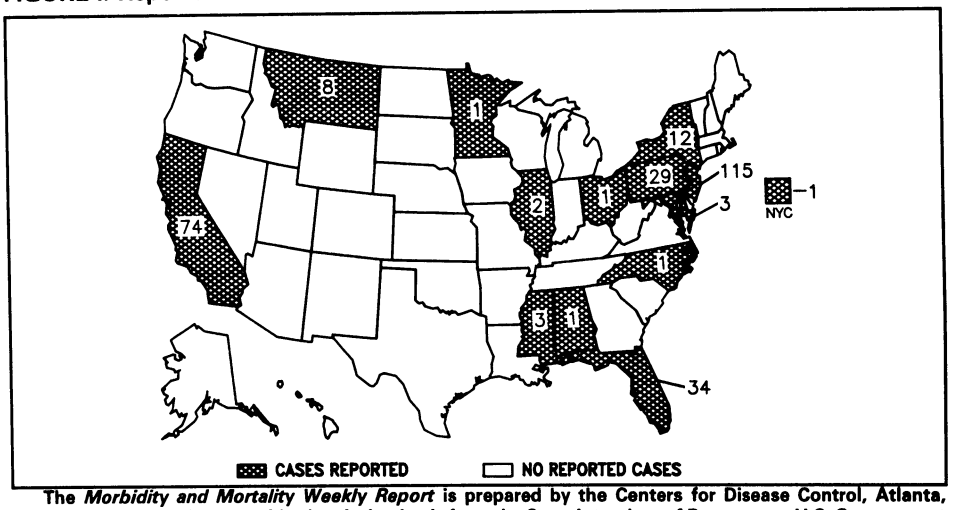
Data from studies on both humans and animals demonstrate a direct link between exposure to radon progeny and lung cancer. Epidemiologic studies provide a basis for quantitatively estimating human risk at various exposure levels. Exposure is quantified using the working level month (WLM), which is a standard measure of occupational exposure to alpha radiation. Analyses show that an exposure to radon of 4 WLM per year over a 30-year working lifetime (the current Mine Safety and Health Administration standard) poses a substantial risk of lung cancer. To determine a REL, NIOSH has weighed this evidence along with uncertainties in the data and the feasibility of controlling exposure to radon progeny in mines. The resulting REL for radon progeny is a cumulative total of 1 WLM per year and an average workshift concentration of one twelfth of 1 working level. These limits are to be considered the upper boundaries of exposure, and every effort should be made to reduce exposures

NIOSH Criteria — Continued

to the lowest concentrations possible. In addition to the REL, the criteria document contains specific provisions for medical monitoring, recordkeeping, respiratory protection, worker education, and sampling and analytical methods. Implementation of all these recommendations will help minimize risk for exposed workers.

Reported by: Div of Standards Development and Technology Transfer, National Institute for Occupational Safety and Health, CDC.

FIGURE I. Reported measles cases — United States, Weeks 31–34, 1988



The *Morbidity and Mortality Weekly Report* is prepared by the Centers for Disease Control, Atlanta, Georgia, and available on a paid subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, (202) 783-3238.

The data in this report are provisional, based on weekly reports to CDC by state health departments. The reporting week concludes at close of business on Friday; compiled data on a national basis are officially released to the public on the succeeding Friday. The editor welcomes accounts of interesting cases, outbreaks, environmental hazards, or other public health problems of current interest to health officials. Such reports and any other matters pertaining to editorial or other textual considerations should be addressed to: Editor, *Morbidity and Mortality Weekly Report*, Centers for Disease Control, Atlanta, Georgia 30333.

☆U.S. Government Printing Office: 1988-530-111/81524 Region IV

HHS Publication No. (CDC) 88-8017